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THE APPRECIATIVE SYSTEM OF URBAN ICT POLICIES
An Analysis of Perceptions of Urban Policy Makers

Galit Cohen* and Peter Nijkamp**

Abstract

Information and Communication Technologies (ICT) have become important tools to promote a variety of public goals and policies. In the past years much attention has been given to the expected social benefits from deploying ICT in different urban fields (transportation, education, public participation in planning etc.) and to its potential to mitigate various current or emerging urban problems. The growing importance of ICT in daily life, business activities and governance prompts the need to consider ICT more explicitly in urban policies. Alongside the expectation that the private sector will play a major role in the ICT field, the expected benefits from ICT encourage also urban authorities to formulate proper public ICT policies.

Against this background, various intriguing research questions arise. What are the urban policy-makers' expectations about ICT? And how do they assess the future implications of ICT for their city? A thorough analysis of these questions will provide us with a better understanding of the extent to which urban authorities are willing to invest in and adopt a dedicated ICT policy.

This study is focusing on the way urban decision-makers perceive the opportunities of ICT policy. After a sketch of recent development and policy issues , a conceptual model is developed to map out the driving forces of urban ICT policies in cities in Europe. Next, by highlighting the importance of understanding the decision-maker's "black box", we identify three crucial variables within this box. In the remaining part of the paper we will operationalize to these three variables by using a large survey comprising more than 200 European cities. By means of statistical multivariate methods (i.e., factor and cluster analysis), we were able to characterize the decision-makers according to the way they perceive their city (the concept of "imaginable city"), their opinion about ICT and the way they asses the relevance of ICT policies to their city. Next, we aim to offer a solid explanatory framework by using a log-linear logit analysis to test the relationships between these three aspects.

Keywords: ICT, perceptions, urban decisions-makers, factor analysis
JEL code: R00

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1. Introduction

Information and Communication Technologies (ICT) are widely recognised as a set beneficial tools to promote various social goals. These collections of technologies and applications are expected to have a prominent impact on society and are regarded as a relevant arena for public intervention. ICT related policies were mainly envisaged developed at national and international levels, but gradually witness an increased attention for urban or local ICT policies, and for the potential of local public policies to complement, induce and substitute for (or even correct) national policies and private forces (Gibbs and Keite, 1997; Graham, 1997; Graham and Dominy, 1991).

There is a variety of ICT policies that can be adopted in cities. On the one side of the spectrum, a city may leave the field to the influence sphere of private forces or to national or international policy constellations. In contrast, on the other side of the spectrum one may find cities with a comprehensive strategy to expand ICT infrastructure, to enhance it usage and to promote extensive tele-activities. Along this spectrum, several cities are also involved in eclectic ICT initiatives and in different ICT-related activities. Various alternative factors may explain the differences in adoption of urban ICT policy, in particular, factors that relate either to the city characteristics (or urban administrative features) or to the personal characteristics of the decision makers in each city. The present study will address the perceptional drivers of urban ICT policy. Specifically, we aim at understanding whether and why an urban decision maker's perception of his/her city and his/her beliefs about ICT can contribute to the explanation of the way he/she assesses the relevance of ICT policy to the city concerned.

2. Background of the study

For more than twenty years already, researchers and planners in many countries have made efforts to hypothesise on, and to predict the effects of, ICT on the city. Ideas about the role of the city, its features or even the question of whether it will survive have been published in many visionary books and papers. These complex relationships have led to many metaphors which try to capture the futuristic and far-reaching consequences of ICT for the city and society at large. The extensive discourse was not merely academic, it gained attention in the popular media as well. Therefore, it is not unreasonable to assume that urban decision makers (both elected politicians and administrative staff) were (and still are) exposed to different ideas about ICT and the city.

Table 1 presents a sample of the metaphors that Graham and Marvin (1996) and Grosveld (2002) have collected to demonstrate the wide use of such images when trying to explore the unknown urban future. Clearly, the large number of metaphors indicates the great expectations on important and significant effects of ICT on the city and its society.

Carefully reading the metaphors in Table 1 can give us illuminating ideas about the hypothesised future city. The main feature of these metaphors refers to the central importance of telecommunications technologies as shaping the city and determining its character. Many metaphors emphasise the invisible aspect of the future city, such as its wires, electronic communications and so on. They highlight the dramatic changes that are

expected to come about. Cities, as we know them today, are known for their visible and tangible aspects: high buildings, transport networks, lights and colours. But the future city is described through its invisible aspects. The absence of the "old" characteristics makes up its important feature. Obviously, the city is still expected to keep its physical characteristics, but, as these metaphors suggest, the invisible part of city life gains in importance.

Table 1: Metaphors of the future city

The knowledge-based city	**Electronic space**	**The overexposed city**
The barrier free city	**Electronic cottage**	**The intelligent city**
The non-place urban realm	**The flexicity**	**The 3D city**
The communications city	**The idea-based city**	**The telecity**
The city in the electronic age	**The binary city**	**Teletopia**
The information city	**The Cyberville**	**The virtual city**
Communities without boundaries	**The elastic city**	**The weak metropolis**
Electronic communities	**The invisible city**	**The wired city**
The informational city	**The fantasy city**	**The network city**

Sources: Graham and Marvin (1996); Grosveld (2002)

Other metaphors emphasise the absence of clear borders of the future city. Its historical development can be seen as a continuous trend. The medieval city had a clear boundary, marked by its surrounding walls. Then, the modern city has extended its area of influence and its borders became vaguer. Finally, as these metaphors suggest, the border of the city will diminish completely, not just with respect to its immediate geographical neighbours, but also with respect to the global environment.

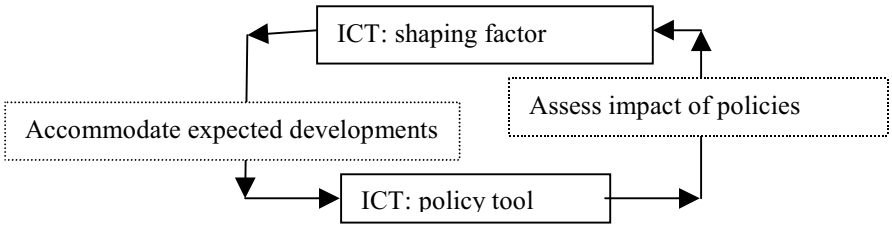
3. ICT as shaping factor and as a policy tool

A large body of literature regarding the city (and society) and ICT has recently emerged. However, most of this literature tries to analyse ICT as a shaping factor or, in other words, is trying to explore the possible spatial and social implications of ICT. In contrast, the current study aims instead to investigate ICT as a policy tool: namely, the ways in which intended ICT policies can (or would) be part of the ICT forces that will shape the urban future. Clearly, these two issues are mutually related and affect each other. Figure 1 demonstrates the interrelationship between these two issues.

On the one hand, when one is trying to evaluate, hypothesise or forecast future influences of ICT, one should also take into account possible implications of policies related to ICT. These policies (or the absence of policies) may affect the way ICT could shape the city and society at large. On the other hand, ICT policies are aiming at accommodating (present and) future needs and developments. Therefore, initiating proper policies should be based on an evaluation of the possible trends and expectations of these technologies. Therefore, although this paper is focused on ICT policies, it will also pay

attention to other aspects of ICT, namely, explanatory theories as well as emerging ideas about the future impacts of ICT. Clearly, the beliefs of urban decision makers about the effects of ICT on the future of the city will affect the policies that they have in mind to accommodate these effects (see Figure 1). We will now discuss some central elements of the above-mentioned relationships.

Figure 1: Interrelationships between ICT as a policy tool and as a shaping factor



ICT as a shaping factor

Forecasting the future spatial and social impact of technologies is an ambitious task. Salomon (1998) demonstrates the complexity by reviewing the case of telecommuting as a travel substitute. He stresses that technologies are social constructs and thus, in order to forecast the impact of such technologies, we have to understand the way the individual decision maker penetrates such a technology, and the extent to which individuals adopt it and change their behaviour accordingly.

An example to illustrate the complicated and multidimensional effects of ICT is the study of Traxler and Luger (2000). They examined possible spatial implications of these new technologies on firms' locations and concluded that ICT can have two opposite effects: dispersion and reinforcement of concentration. Indeed, a relatively large body of literature comes up with such contradictory conclusions about the expected effects of ICT, emphasising the complex effects of these technologies on the behaviour of people and organisations.

Goddard (1991) developed a conceptual model to assess the possible effects of ICT on the urban form, which emphasises the effects of ICT on organisations. He recognised three levels of analysis that are needed to evaluate the expected future effects, viz. the organisation level, the effects on infrastructure, and the effects on different sectors. Often much of the research about the effects of ICT on the urban form is concentrated on one single channel of research. In most cases, there is no aggregate analysis that examines the overall and interrelated effects of these technologies on the city as a whole. Thus, the empirical evidence is eclectic and we still do not have an integrated picture of the foreseeable changes.

The importance of the city

Futuristic views often claimed that ICT are expected to substitute physical movements so that agglomerations (and cities) might become irrelevant. Such deterministic views see ICT developments as radically reshaping society, and by extension, cities. However, as

these technologies were already adopted, most of the researchers were convinced that the city was not going to disappear. Not only has the attractiveness of large cities not reduced, but some developments suggest that ICT reinforce the position of large cities (Moss, 1991). Kollko (1999) suggests that ICT has led to the "death of distance", but not to the "death of cities". However, Graham (2002) claims that both distance and cities are far from being dead, and that geography still matters (see also Nijkamp et al., 2002).

Moreover, Graham and Marvin (2000) indicate that most ICT applications are largely metropolitan phenomena and that ICT and large metropolitan areas are mutually supporting phenomena. From another perspective, Beyers (2000) stresses that perhaps technology enables living far from city centres, but he also argues: *"…Not only are many businesses in the information society strongly tied to localized markets, but it is also in cities that most people working in these sectors* ***want*** *to live, for reasons related to consumption and tastes, and dictated by spousal relationships and other social relationships."*

ICT as the new transport mode

The relationships between transport and telecommunications have received much attention over the last two decades (Hepworth and Ducatel, 1992; Mokhtarian, 1991; Nilles, 1988; Salomon, 1986; Mokhtarian and Salomon, 2001). There are several obvious reasons for this. Both technologies belong to a class of 'friction-reducing technologies', both have a network structure, and in some cases, there is a (considerably overstated) potential for substitution between physical travel and virtual travel. As both technologies facilitate remote activities, there was much interest in the potential substitution of tele-activities for physical travel (Boghani et al., 1991; Garrison and Deakin, 1988).

Grant and Berqiust (2000) argue that ICT networks will play the same role in the 21st century that streets and highways played in the 20th century. Just as the car has affected the shape of urban areas, there is an expectation that ICT will change cities. The "information highway" now inherits the role of the physical highways and substitutes physical movements with electronic movements. Therefore, while transport was the "maker and breaker of cities" (Clark, 1957), ICT are expected to inherit or share this role.

Couclelis (1994) termed both transportation and ICT as "spatial technologies". Shen (1998) even suggests measuring accessibility not just with respect to mobility (physical transport) but to combine mobility options and the spatial structure along with accessibility via ICT modes. Horan and Jordan (1998) and Coucelelis (2000) have suggested integrating and incorporating transport planning and ICT policy in urban policy, both being tools to enhance accessibility.

Mokhtarian and Meenaksisundaran (1999) remind us that alongside substitution effects between transportation and ICT, there is considerable evidence suggesting stimulation or generation effects as well. That is, ICT can stimulate more physical travel. Moreover, ICT can change travel behaviour, not just the decision about the travel itself. As a result, it may have impact on peak-hours (one of the most problematic phenomena for transport planners) and the routes that are chosen. Clearly, the fourth possible relationship may be neutrality, i.e., when the use of one mode has no impact on the other mode. It goes without saying that more empirical research is needed here.

Bearing in mind all possible four relationships (substitution, generation, modification and neutrality), the expected effects of ICT in the transportation system become complex and multifaceted. For example, Gasper and Glaeser (1998) examined the relationships between face-to-face meeting (the "old" transport mode) and telephone usage (the telecommunication mode). They concluded that as telecommunications improve, the demand for interactions of all varieties should rise, including face-to-face meeting.

However, ICT are not just considered as a possible substitution for physical transport. It can also offer tools to increase the quality of transportation networks and services. As Giannopoulos and Gillespie (1993) argue, ICT open *"new complementarities and potential synergies, most evident in the way telematics networks are becoming integral to an increasing array of transport operations"* (30). For example, ICT can give real time information about traffic conditions, parking availability and facilitate a more efficient management of public transport (for more applications, see Nijkamp et al., 1996).

ICT as a policy tool

As the previous sections demonstrate, ICT are expected to have significant influences on the city, its shape and its metabolism. Therefore, one would expect that urban planners and urban decision makers are likely to be major players in the ICT field. Indeed, some scholars are urging and hurrying urban decision makers to act in that field. However, as Graham and Marvin (2000) argue, despite the central importance of the 'urban' in cyberspace debates, issues of urban policy and planning have been virtually absent within both the popular and academic sides of the discussion.

One area that has attracted a great deal of attention is the provision of municipal information and services through ICT applications (mainly via the Internet). Providing municipality information and services can serve a number of goals. The first one is the improvement of services to the citizens, and the supply of more efficient services. A second goal is supplying information about the city to potential investors, inhabitants or tourists (unfortunately many municipal web-sites in Europe are available just to native-language speakers). A third goal is to increase public participation in local processes by better information and possibilities to react, on-line, to proposals in the city agenda (E-governance). Rouillard (1999) explores the possibilities of ICT as a tool for public participation and concludes that E-governance can make the policy- making process both transparent and vague, so it is not a guarantee for an informed public (see for further exposition also Leinbach and Brunn, 2001).

As was described in the previous sections, the information revolution is far from its end. Although we have witnessed enormous technological developments in the last centuries, there are still expectations for further rapid technological developments. However, much of the technology is already in use, followed by economic, sociological and spatial changes. In many cities, the local authority has recognised the importance of ICT (Gibbes and Tanner, 1995) and the information revolution, and some of them are making efforts to accommodate these changes, to mobilise ICT for general social purposes and to correct unwanted developments caused by market failure.

Table 2 offers several examples of various urban ICT policies that were implemented in cities. More details about these initiatives are dealt in a number of recent studies (see

Urban, 2002; Graham 2002; Mokhtarian and Varma, 1998; Berranger and Meldrum, 2000). Clearly, this is still a rich field of both empirical and policy research.

Table 2: Examples of implemented urban ICT policies

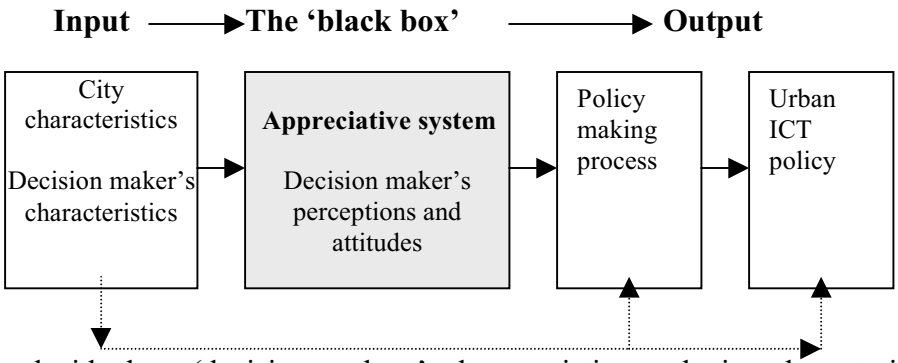
Policy	Implementation
Municipality web-site	Supply municipal information; Supply municipal services; Advertise the city (national and international)
ICT infrastructure	Extend municipal internal broadband network to a wider population; Partnership with private telecom firms to extend their optic-fibre networks; Build the networks and then open them up to telecom providers
Encourage ICT usage	Community tele-centres; Training and support services; Computers in public places
Encourage teleworking	Neighbourhood telecommuting centres
Introduction of ICT application in small and medium businesses	Intranet for business

4. Urban policy making as a mental process

This study takes a cognitive approach of policy-making research, which focuses on how decision makers' beliefs, attitudes and preferences affect their decision. Our theoretical framework is based on Vickers' (1965) theory on the appreciative system that was developed to understand the mental process of decision making. He stresses that it is important to understand the way in which a decision maker constructs *reality,* on the one hand, and *values,* on the other. The process of reality judgement and of value judgement leads to action judgement or, in other words, to a concrete idea about the nature or direction of policies that should or could be taken. These three aspects of judgment create the "appreciative system" of the decision maker (Vickers, 1965; Parsons, 1995). Understanding the appreciative system is especially relevant to the discourse on ICT, which is full of untested metaphors and speculative visions (as was demonstrated above). Therefore, it is important to include visions (values) as explanatory factors in the assessment of different urban ICT policies. The appreciative system of a decision maker is part of his 'black box', i.e., the hidden mental process that cannot be observed directly. Although it is invisible, it is hypothesised to affect the decision maker's decision and behaviour and, consequently, the policy he considers. The way a decision maker judges the reality, and the norms that he has, affects the assessment of possible actions. Policy is a consequence of the action judgement. Figure 2 offers the framework to study urban ICT policy from the perspective of the individual decision maker. It emphasises the relationships between the perceptions, attitudes and beliefs of the decision maker and the policy-making process that results in ICT policy. The main focus of our study is the black box of the decision maker or, in Vickers's terminology, his appreciative system. We claim that there are three aspects within the black box that are relevant to the process of ICT-related policy making: the perceptions of the city, the beliefs about and attitudes towards ICT, and perceptions of ICT policies. Moreover, we claim that there are causal relationships among these three aspects: the perceptions of the city and beliefs about and

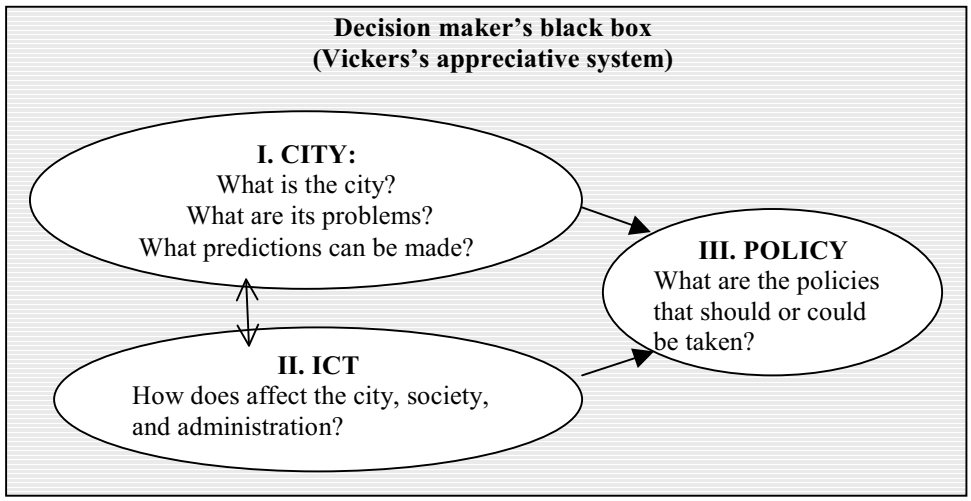
attitudes towards ICT are likely to affect the perceptions of ICT policies. The underlying assumption is that attitudes are significant determinants or predictors of behaviour, that a certain way of perceiving the relevance of ICT policy will be followed by a corresponding reaction to ICT-related policies when they are relevant.

Figure 2: General model of the decision-making process.



The left-hand side box (decision makers' characteristics and city characteristics) represents the real world. Clearly, these two factors also have a direct influence on the policy that is taken or planned (as the dashed lines suggest). However, in the present study we address the black box itself, and thus we aim at developing a way to measure or quantify the black box. The perceptions and attitudes of the decision maker have three sub-boxes that represent Vickers's appreciative system. Figure 3 highlights the appreciative system, and divides the 'black box' into three components. The left-hand parts (I and II) reflect the reality judgement and the visions of the decision maker with regard to his or her city and ICT. The third part (III) reflects the policy judgement, viz. the way the decision maker assesses the policy alternatives. As Figure 3 demonstrates, we hypothesised that that perception of ICT and the city are mutually affected. Clearly, we seek to test in particular the relationships between "city" and "policy", and "ICT" and "policy".

Figure 4: General structural model of decision maker's black box



5. In the search for facts: the European survey of the TeleCityVision project

Empirical facts on urban ICT policies and perceptions are scarce. As part of the European project TeleCityVision[1], an extensive survey was conducted, targeting urban decision makers (both politicians and responsible administrative staff) in more than 200 cities in 7 European countries (Austria, France, Germany Ireland, Norway, the Netherlands, and Spain). The survey was conducted between May and September 1999. It was sent to various departments in the municipality that were supposed to have a direct or indirect influence on ICT-related activities in the city, as well as to elected officials of the city (politicians).

Table 3: Number of respondents according to countries

Country	No. of respondents (in brackets, percentage of the sample)		No. of cities sampled
Austria	91	(5.8%)	20
France	114	(7.3%)	29
Germany	795	(51.1%)	74
Ireland	80	(5.1%)	18
The Netherlands	130	(8.3%)	27
Norway	180	(11.5%)	23
Spain	172	(11.0%)	48
		(100%)	
Total	1562		239

Approximately 1,500 responses were returned (the response rate varied across the countries, between 20 and 40%). Table 3 presents the distribution of responses according to their country and the number of cities that were sampled. After accounting for missing values in the variables that are relevant to our study, the sample size was reduced to 1,391 respondents. The respondents came from various field of professional activities. The largest group is the urban planners (32.5%) followed by economists (15.8%) and elected politicians (15.3%). The rest of the respondents are from transport departments, ICT departments, and other general departments. The educational level of the respondents is relatively high. The vast majority of the respondents in our sample have at least a Bachelor's university degree. Further details on the sample characteristics can be found elsewhere (Cohen, 2002).

6. Operationalising the appreciative system

As the conceptual model in Figures 2 and 3 suggest, we are interested in measuring the black box of the decision makers. More specifically, we aim at measuring the way decision-makers perceive their city (the 'imaginable' city), their beliefs about ICT, and the way they perceive urban ICT policy. Since all these three aspects are not trivia, we need observed variables to give then an operative meaning.

[1] The TeleCityVision-Project was funded by the European Commission, and co-ordinated by BIS, with the foll0wing participants: BIS (Germany), COMTEC (Ireland), ESI-VU (The Netherlands), ETSI-UAM (Spain), ICCR (Austria), THEMA (France), and ZTG (Germany)

The "imaginable" city

In our approach we introduce the concept of the 'imaginable city'. This is an artificial construct on the base of systematic typology of the key factors comprising attributes, perceptions and views of the city, as revealed by the urban policy maker. Here we assume that the imaginable city is built from three building blocks of the city: main functions; problems; and expectations of the future. We have chosen to develop a systematic classification based on these three main profile elements of the city. The first dimension, following the classic city typology, is the *city's function;* it represents the subjective evaluation of the respondents of the main sectors and activities of the city, as well as its main images as represented by its activities. We have in our empirical survey listed various classic urban functions and asked the respondents to evaluated to what extent these functions are relevant to their city: industrial centre, service centre, administrative centre, logistic centre, tourist centre, commercial centre, ICT/multimedia centre, and higher education centre.

The second dimension, *problems of the city*, is also a logical choice for establishing a city profile. Given that we are interested in policies, and since policies are assumed to be a response to social problems in the city, the way a respondent assesses the relevance of an urban problem to his/her city is an important piece of information. The respondents were asked to evaluate to what extent the following urban problems are relevant to their city: traffic congestion, housing shortage, unemployment, industrial decline, ageing population, negative image, and budget deficit.

The third dimension, *evaluation of future trends*, represents the beliefs of the decision makers about the city that may affect their evaluation of policies to accommodate these trends. A list of trends regarding the attractiveness of the city was offered and the respondents were asked to evaluate whether these trends are likely to increase or decrease: the importance of their city, the potential to attract service companies, the potential to attract industrial enterprises, the potential to attract new residents, and the importance of the CBD.

Beliefs about and attitudes towards ICT

Beliefs about, and attitudes towards ICT relate to various aspects and ways in which ICT may affect human life. Thus, it is important to recognise patterns of opinions about ICT, by using a list of statements regarding ICT relationships with the urban administration, the city and society at large. We distinguished specifically three relevant dimensions of beliefs about ICT and the way it affects urban life: *ICT effects on urban future trends*; *ICT effects on urban administration* and urban governing; and, *ICT effects on social life*.

The first dimension tries to capture the perceived role of *ICT in shaping urban trends* that were listed in the third dimension of the imaginable city. The respondents were asked to evaluate how much influence ICT are expected to have on these trends (the importance of their city, the potential to attract service companies, the potential to attract industrial enterprises, the potential to attract new residents, and the importance of the CBD).

The second dimension assesses the perceived *impact of ICT on administrative behaviour* and its relationships with citizens. The respondents were asked to indicate to which extent they agree with the following statements: ICT change the policy-making process; ICT make implementation of policies more efficient; ICT improve the ability of the administration to serve the citizens; ICT improve citizens' access to useful information; ICT give the administration better access to public opinion; and ICT increase citizen participation in the policy process.

The third dimension assesses to what extent the respondents agree with the following statements regarding *ICT and society*: ICT provide all segments of the population with equal access to education, employment and social services; ICT improve the quality of social relationships.

The endogenous variable: assessment of urban ICT policy relevance

Our model aims at explaining variance in perceptions of urban ICT policy by perception of the city and beliefs about ICT (the two variables that were built in the previous sections. However, Measuring the variable of policy perception, the assessment of the relevance of ICT policies, is a challenge, both theoretically and empirically. Often, in empirical studies, the policy variable is binary (in favour or against policy). In those cases, the policy is assumed to be already a complete 'package' and the question is then whether the policy maker (or voter in other cases) approves or disapproves of the policy. In our study, there is no 'ready-made' policy. On the contrary, the composition of the policy is one of the interesting tasks of the research. Since in most of the cases there is no comprehensive ICT policy and since the experience with urban ICT policy is very limited, there are no 'ready made' ICT recipes. Therefore, the way decision makers perceive the possible ways of interventions in the field of ICT can vary in many aspects. We have identified two aspects of the policy: the role of the municipality and the goals and the relevant tools of urban ICT policy.

The role of the municipality is an important issue for urban ICT policy, since some decision makers may think that the municipality has a major role in the ICT field, but others may think differently. The way they perceive the importance of the role of the municipality may affect their support in such interventions. To capture this aspect, we use the answer to the following question: "*How much influence does the municipality have with regard to the application of ICT in your city (High, medium, low, none)?*

The goals and relevant tools of urban ICT policy are the second dimension of our policy variable. Specifically, we are interested in the main goals for which ICT should be mobilised and what kinds of tools are perceived by the decision makers as relevant, and whether they are aware of the variety of opportunities that exist.

The questionnaire contained statements that explored the way the respondents perceive the relevance of ICT to achieve general urban goals, as well as the relevance of different ICT measures to their city. A list of the relevant statements regarding possible goals and means was presented. In addition, the questionnaires listed 11 possible tools to employ ICT policies to enhance ICT in the respondents' city and they were asked to point out how relevant each tool is for their city. The compleate list of goals and tools is presented in Table 1 in the Annex.

Interestingly, a substantial share of the respondents chose the option DK (don't know), or skipped the items (more than 40%), with regard to the different options, indicating a lack of knowledge, interest or awareness regarding such policy tools. Therefore, we have decided that an important indicator for measuring relevant tools as perceived by the respondents is 11 minus the number of DK answers for each respondent as the indicator for the level of knowledge and awareness of relevant ICT measures. Since we decided to combine the statements regarding general goals with the statements regarding specific ICT tools, the second variable to measure policy perceptions is the sum of all very much" and "strongly agree" answers to the above 14 statements and the ICT tools list. The logic behind this variable is that the higher the number of "very much" answers indicated by the respondent, the more broad his/her likely view about the opportunities that ICT policy can offer his/her city. Since views about the possibilities for urban ICT vary among urban decision makers, this variable can help to test to what extent they perceive ICT policy as a tool to achieve many goals, and tools relevant to urban challenges.

7. Statistical analysis

The first step in our analysis is the identification of the latent variables that represent the typical dimension of the "city" and "ICT", based on the indicators described above. Factor analysis techniques were used to create these latent variables. The analysis suggested that the three dimensions of "city" could be represented with five latent variables, since both dimensions of the functions and the problems of the city were split into two. In the list of urban functions, two functions were distinct from the others, viz. the industrial function and the logistic function. The industrial and logistics functions appeared to have a low correlation with the rest of the function indicators. Indeed, it seems plausible that the industrial functions differ from the other functions, in particular the post-industrial functions of the city. Therefore, although our analysis is empirically driven, it may also confirm a theoretical feature of the contemporary city: industrial aspects of the city are perceived differently from the remaining aspects.

With regard to the problems of the city, the empirical tests were also able to discover two distinct kinds of problems: on the one hand, problems related to spatial characteristics (e.g., traffic congestion and housing shortage), and on the other hand, problems related more to the socio-economic conditions (e.g., unemployment, industrial decline, ageing population, negative image and budget deficits). Here again, the empirical findings convinced us that these two aspects of urban problems had also a theoretical underpinning. Consequently, the dimension of urban problems also has two separate constructs.

In general, the 5 factors that were created by the factor analysis account for 58% of the variance in the 20 indicating variables. Moreover, the factor analysis confirms that the three dimensions of "ICT" can be represented by 3 latent variables. These three factors account for 55% of the variance in the 13 indicators variables. Tables A1 and A2 in the Annex present the components of each factor and identify the dominant factor for each indicating variable.

In the factor analysis, each individual variable gets a "factor loading", i.e. the correlation between the original variable and the factors calculated in the factor analysis.

Thus, for each variable, the factor with the highest value is assumed to represent best the variable itself. Grouping the variables according to their factor loadings is supposed to create the latent constructs (the factors variables) that best represent all relevant variables in the group. With the factor loading each observation gets a "factor score", a composite measure for each observation on each factor extracted from the factor analysis. The factor weights are used in conjunction with the original variable values to calculate each observation's score. These scores can be used to represent the factors in a subsequent analysis. After each observation had been identified by its factor score, thee next step is to examine whether we can identify groups of respondents according to a common perception of the city and their beliefs about ICT, as described by their factor scores. In other words, after clustering variables by means of factor analysis methods and creating a reduced number of variables that represent the city, we will go on to investigate whether we can cluster observations according to these variables and identify clusters of imaginable cities.

The cluster analysis was carried out in two stages. The first step was a hierarchical cluster analysis, where clusters were determined in a hierarchical process. It starts with N-1 clusters (N= sample size) and in each step the number of clusters is decreased according to specific criteria (average linkage between groups, clustering according to the average similarity for links between two centres; see Anderberg, 1973). The process ends with just one cluster. Naturally, reducing the number of clusters also reduces their homogeneity; thus, the optimal number of clusters is the lowest number of clusters that have an acceptable level of heterogeneity. The second step uses the clusters that were found in the first step as initial centre points for the K-means cluster analysis. Here, the number of clusters is determined a priori, where, in an iterative process, observations are clustered around centroids that are adjusted in each iteration. Since the initial centroids affect the clustering process (clustering the same data with different initial centres would produce different clusters), we have used the mean values of each cluster that was created in step 1 as the initial centroid for the second clustering process. On the basis of these two clustering processes, 7 and 5 clusters were created, representing, respectively, different perceptions of the city and beliefs about ICT. At the end of the process, each cluster can be characterised by the mean value of the latent constructs by which it was clustered. In other words, each cluster has a dominant perception or set of beliefs that characterise the respondents which belong to the cluster.

According to the average score in each cluster, we can characterise the average choices of the respondents in those clusters. These scores can then be translated back to the ordinal scale (bearing in mind that the scores are just an approximation, and that the verbal representation is used in order to distinguish between different clusters). Since in our questionnaire "very much" answers were assigned the value "1" and "not at all" answers were assigned the value "4', it means that high values indicate less relevance and low values indicate a high relevance. Thus, negative values of the factor scores represent the answers "very much " and "to some extent", and positive values represent the answers "a little " and "not at all". Table 3 includes the verbal meaning of the average factor scores.

8. Clusters for imaginable city and beliefs about ICT

Table 3 presents the mean value of each latent construct for the 7 clusters of imaginable cities. Moreover, where there is a unified pattern in a cluster regarding a latent construct, the Standard Deviation (SD) of the cluster is also presented to indicate the extent to which the cluster is indeed homogeneous. In most of the cases, the SD indicates that the mean is significant, i.e. the variation within the cluster is not large.

As Table 3 demonstrates, not all the aspects of the city are homogeneous in each cluster. For some latent constructs, the respondents in a certain cluster do not have similar scores. For example, in Cluster 2, there is no unified perception with regard to the construct of spatial problems. However, with regard to all the other four constructs, the respondents tend to have similar ideas. Actually, Cluster 1 seems to represent all the respondents that do not belong to any other cluster, and most of the latent constructs are not homogeneous in this cluster.

Table 3: The 7 clusters of imaginable cities

	Industrial functions	**Urban functions**	**Spatial problems**	**Socio-economic problems**	**Future trends**
Cluster 1: Mixedl cluster	Mean = 1.39 SD=.53 not at all	No pattern	No pattern	Mean = -.63 SD= .39 to some extent	No pattern
Cluster 2: Struggling industrial city	Mean = -.64 SD=. 31 very much	Mean = 1.29 SD=.59 not at all	No pattern	Mean = -.66 SD=.32 v.much-to some extent	Mean = .5 SD=.41 Same
Cluster 3: Pessimistic regional city	No pattern	Mean = -.73 SD=.47 very much	No pattern	No pattern	Mean = 1.23 SD=.59 decrease
Cluster 4: Overcrowded optimistic semi-industrial city	Mean = .58 SD=.42 a little	Mean = .99 SD=.53 not at all	Mean = -.49 SD=.39 to some extent	Mean = 1.1 SD=.63 not at all	Mean = .39 SD=.30 increase to some extent
Cluster 5: Overcrowded multi-functional city	Mean = -.58 SD=.36 to some extent	Mean = -.44 DS=.32 to some extent	Mean = -.58 SD=.34 to some extent	Mean = 1.27 SD=.56 not at all	No pattern
Cluster 6: Multi-functional city with severe urban problems but optimistic expectations	Mean = .46 SD=.37 a little	Mean = -.50 SD=.34 to some extent	Mean = -.73 SD=.42 very much	Mean = -.63 SD=.45 to some extent	Mean = -.78 SD=.49 Increase considerably
Cluster 7: Stable optimistic regional city with few socio-economic problems.	Mean = .36 SD=.32 a little	Mean = -.41 SD=.39 to some extent	Mean = 1.2 SD=.55 not at all	No pattern	Mean = -.43 SD=.39 increase to some extent

The 7 clusters suggest 6 different types of cities (leaving out the unidentified Cluster 1), as perceived by the respondents. The names of the clusters in Table 3 provide a short summary of these clusters.

Struggling industrial city In Cluster 2, we can find respondents who perceive their city as having a strong industrial function, while the other regional functions are not relevant to their city. They tend to think that their city is suffering from socio-economic problems: some think that the city has severe socio-economic problems, while others

think there are problems, but to a lesser degree. Moreover, most of the respondents in Cluster 2 foresee that the attractiveness of the city will remain the same as today.

Pessimistic regional city Respondents in Cluster 3 think that their city serves as a regional centre, with all the classic functions of such a city. However, they have rather pessimistic views on the future, since they anticipate a decrease in the ability of their city to attract firms and people, and a decrease in the importance of the city's CBD.

Overcrowded optimistic semi-industrial City In Cluster 4, we find respondents who see their city as having industrial functions, to a small degree, and no regional functions at all. There are spatial problems, to some degree, but no socio-economic problems. The ability of the city to be attractive is expected, to some degree, to increase.

Overcrowded multi-functional city In Cluster 5 there are respondents who consider their city as having, to some degree, both industrial and regional functions. While this city faces some spatial problems, there are no serious socio-economic problems.

Regional city with severe urban problems but optimistic expectations In Cluster 6 we =have respondents who attach just a little relevance to the industrial functions of their city. However, other regional functions are more relevant. There are severe spatial problems, and to a lesser degree socio-economic problems. Still, there are very optimistic future expectations.

Stable optimistic regional city with few socio-economic problems The respondents in Cluster 7, as in Cluster 6, attach just a little relevance to the industrial functions of their city, but other regional functions seem more relevant. However, in contrast to Cluster 6, there are no spatial problems (about socio-economic problems the opinions are divided). Here also, but to a much less extent, there are also optimistic views about the ability of the city to be attractive.

It is important to note that the membership of each respondent to a cluster represents the way he or she perceives his/her city. Thus, respondents from the same city may belong to different clusters. For example, out of 19 respondents from the German city of Hamburg, 1 belongs to Cluster 1, 1 belongs to Cluster 2, 3 belong to Cluster 3, 4 belong to Cluster 5, 7 belong to Cluster 6 and 3 belong to Cluster 7.

The respondents from Frankfurt also have diverse interpretations of their city. Out of 15 respondents, 8 belong to Cluster 3, 5 belong to Cluster 6 and 2 belong to Cluster 7.

Actually, in most of the cities, there is no unified and agreed perception of the city and its future. However, there are some examples of more unified opinions about a city. In the Norwegian city Steinkjer, all the 7 respondents belong to City Cluster 7. In the Dutch city Rotterdam, out of 8 respondents, 7 belong to Cluster 6 and 1 belongs to Cluster 2, and in the German city Duisburg, out of 9 respondents, 8 belong to Cluster 2.

As mentioned earlier, the perceived city is the reference city for which the decision maker is making decisions. Hence, it is interesting to see that decision makers from the same city have different pictures of their reality in mind and different expectations for the future. They may, as our model hypothesised, also have different assessments of the relevance of ICT policies to their city.

Table 4 presents 5 different prototypes of ICT approaches according to the 3 latent constructs that represent beliefs about ICT. Here again, the table presents the mean value of each factor in the cluster. In those cases where the clusters are relatively homogeneous with respect to a certain factor, the standard deviation is also presented to evaluate the significance of the mean.

Instrumental effects type of beliefs characterise those respondents in Cluster 1 who believe that ICT will have strong positive effects on the administrative activities and their relationships with the citizens. They strongly disagree with statements that attach positive social gains to ICT.

Revolutionary effect type of beliefs characterise those respondents in Cluster 2 who anticipate radical influences of ICT in all the 3 aspects. They think that ICT have a medium to high influence on future urban trends, that it will affect municipal activity, and that it will have a positive impact on relevant social aspects.

Table 4: The 5 clusters of beliefs about ICT.

	ICT effects on urban trends	ICT effects on urban administration	ICT effects on society
Cluster 1: Instrumental effects	No pattern	Mean = -.68 SD=. 45 strongly agree	Mean = .95 SD=.51 strongly disagree
Cluster 2: Revolutionary effects	Mean = -.68 SD=.44 medium-high	Mean = -.51 SD=.32 agree	Mean = -.85 SD=.46 strongly agree
Cluster 3: Economic tool	Mean = -.87 SD=.51 high	Mean = .94 SD=.52 strongly disagree	No pattern
Cluster 4: Strong scepticism	Mean = .90 SD=.63 none	Mean = 1.15 SD=.58 strongly disagree	No pattern
Cluster 5: Social and administrative effects	Mean = 1.24 SD=.69 none	Mean = -.74 SD=.41 strongly agree	Mean = -.53 SD=.34 Agree

Economic effect types of beliefs distinguish those respondents who are grouped in Cluster 3. In this cluster, the respondents anticipate that ICT will have a high effect on the future ability of their city to be attractive. However, they strongly disagree with statements that suggest changes in improvement in municipality activity as a result of ICT use.

Strong scepticism characterises respondents in Cluster 4. They do not think ICT will affect attractiveness trends, nor that ICT will have a positive effect on municipal activity.

Social and administrative effects are anticipated by the respondents in Cluster 5, who do not think that ICT will affect the attractiveness trends of the city, but believe that ICT will have strong effects on administration, and to a lesser degree, on society.

9. A log-linear logit analysis of the relationships between membership in "city" and "ICT" clusters and the choice of policy

In the previous section, we created clusters that describe 7 types of imaginable cities and 5 types of beliefs about ICT. Each respondent belongs to one cluster of city and one cluster of ICT. In this section, we aim to test whether membership in a particular city and ICT clusters has an influence on the policy choices, i.e. their scores in the 3 policy variables that were created in the previous section. In other words, we have to test whether there are significant relationships between cluster membership and policy perception. City clusters and ICT clusters are categorical variables, i.e. the number

assigned to the cluster has no meaning, and serves only as a title. Therefore, we have chosen the statistical technique of log-linear logit analysis that is suitable to test categorical variables.

The log-linear logit technique is used to model the relationships between one or more dependent categorical variables and the categorical independent variable. The log-linear approach models cell counts in a contingency table in terms of associations among the variables and marginal frequencies. While the log-linear model makes no distinction between dependent and independent variables, the Log-linear logit model focuses on the effects of the independent variables (city, ICT) on the dependent variable (policy). Thus, instead of cell frequencies, the Log-linear logit model estimates the logarithm of the odds of each of the independent variables having a certain score. For example, Table 7 presents the odds ratio of being in a certain City cluster and the perception of municipality influence on ICT. Being in City Cluster 7 and perceiving a high influence of the municipality are the reference categories. Thus, the odds of the other categories are compared with this reference category.

In order to interpret the odds ratios, they are also presented after taking the exponent. When the value of the parameter is greater than 1, it means that the odds of being in a certain category are bigger than being in the reference category. When the estimate is between 0 and 1, the odds of being in a certain category is smaller than being in the reference category.

Municipality influence on ICT

The first model tests whether there are relationships between the perception of municipality influence on ICT and a membership in city and ICT clusters. The model tests the association between perception of municipality influence (Policy 1) and membership in a City cluster, and the relationships between the perception of municipality influence and membership in an ICT cluster. We eliminate the two way and three-way association (namely, perception of municipality influence * City cluster membership * ICT cluster membership) since they were all insignificant.

To test whether the model fits the observed data there are two statistics, the likelihood-ratio chi-square and the Pearson chi-square statistic. For large sample sizes, these statistics are equivalent. Table 6 presents the goodness-of-fit statistics for the first model.

Table 6: Goodness-of-fit statistics for model with Policy 1

	chi-square	Degrees of Freedom	Significance
Likelihood ratio	69.9	72	.5493
Pearson	65.9	72	.6807

According to the significance level of both the likelihood-ratio and the Pearson statistic we have no reason to believe, with a probability level of .05, that the model with two-way relationships does not fit the data.

Table 7 compares the odds ratios of perceiving that the municipality's influence on ICT are less than high, depending on the cluster of the imaginable city. The parameter estimate for City Cluster 1 (general cluster) and "low" is .77. Exp (.77)=2.2, which tells us that, on the basis of the model odds are 2.2 higher that respondents in Cluster 1 think

the influence is low rather than high, compared to thinking that the influence is low rather than high in the reference category (7). The odds that respondents from City Cluster 2 (Struggling industrial centre) attach low influence, compared with high influence, are 2.6 times higher than for respondents in City Cluster 7.
The tendency to think that municipality influence is medium, compared with high, in City Clusters 1, 2 and 3 is higher (1.6 to 1.8 times) compared with the opinions of respondents from City Cluster 7 who choose medium compared with high.

In general, respondents in Clusters 1, 2, and 3, compared with respondents from Cluster 7, tend to attach lower influence to ICT-related municipality activities. The other estimates are not significant and hence their interpretation is more risky.

Table 7: Log-linear logit estimates of City Cluster membership and perception of municipality influence on ICT : log of odds ratio

	None ($e^{estimate}$)	Low ($e^{estimate}$)	Medium ($e^{estimate}$)	High
City1: General cluster	.32 (1.4)	.77* (2.2)	.47* (1.6)	Reference category
City2: Struggling industrial centre	1.08 (2.9)	.94* (2.6)	.53* (1.7)	Base level
City3: Pessimistic regional city	.62 (1.9)	.59* (1.8)	.60* (1.8)	Base level
City4: Overcrowded optimistic semi-industrial city6	.51 (1.7)	.01 (1.01)	.01 (1.01)	Base level
City5: Overcrowded multi-functional city	-.18 (.83)	.2 (1.2)	.05 (1.05)	Base level
City6: Multi-functional city with severe urban problems but optimistic expectations	.6 (1.8)	-.08 (.92)	.09 (1.09)	Reference category
City7: Stable regional city with some socio-economic problems	Reference category	Reference category	Reference category	Reference category

*|Z-value| >1.96 (significant at .05 level).

Table 8 presents the odds ratios of perceiving municipality influence on ICT less than high, depending on the cluster beliefs about ICT. We can see that respondents who belong to ICT Cluster 2, who believe in revolutionary changes due to ICT, are more likely to think that municipality ICT activities have a high influence than to think that they have a low and medium influence, compared with the Reference Cluster 5. According to the model, respondents in Cluster 3 are almost 3 times less likely to think that municipality influence is low rather than high, compared with respondents from Cluster 5 who choose low and not high. In contrast, respondents who belong to Cluster 4, who are characterised by strong scepticism, are also sceptical about the influences of municipality ICT activities. For example, respondents in Cluster 4 are almost 4 times more likely to think that there is a low influence than a high influence, compared with Cluster 5 who choose low and not high.

Table 8: Log-linear logit estimates of ICT cluster membership and perception of municipality influence on ICT: log of odds ratio

	None ($e^{estimate}$)	Low ($e^{estimate}$)	Medium ($e^{estimate}$)	High
ICT1: Instrumental effects	.36 (1.4)	.001 (1.001)	-1.17 (.3)	Reference category
ICT2: Revolutionary effects	-1.68 (.19)	-1.18* (.3)	-.53* (.6)	Reference category
ICT3: Economic tool	-.36 (.7)	.20 (1.2)	.2 (1.2)	Reference category
ICT4: Strong scepticism	.29 (1.3)	1.3* (3.7)	.66* (1.9)	Reference category
ICT5: Social and administrative effects	Reference category	Reference category	Reference category	Reference category

*|Z-value| >1.96 (significant at the .05 level).

Relevance of ICT goals and tools

The second policy variable is the sum of all the "very much" and strongly agree" answers to the 14 statements on ICT tools listed in the questionnaire (for more details we refer to Section 6). However, instead of having 14 categories, a new variable was created, with only 4 categories. The new categories are as following:
0-2 answers of "very much" = none;
3-4 answers of "very much" =low;
5-7 answers of "very much" =medium;
8-14 answers of "very much" =high.

The variable was categorised such that, in each category, there are approximately 25% of the respondents and thus the variable Policy 3 represents 4 categories of the extent to which the respondents assess different ICT measures and goals as very relevant to their city.

According to both the Likelihood ratio (83.6 with 72 DF, significance level .1646) and the Pearson statistics (78.7 with 72 DF, significance level .274), we have no reason to believe, with a probability of .05, that the model with two-way relationships does not fit the data.

Compared with City Cluster 7, the respondents from all the clusters (apart from Cluster 6) are 2.4 to 4 times more likely to see no or hardly any relevance than to see high relevance. In Cluster 2 (struggling industrial city), the odds of regarding ICT tools as of no or little relevance to the city compared with high relevance are 3.8 and 2.3 times more likely, respectively, compared with the opinion no or low relevance in Cluster 7.

With regard to ICT clusters, it is not surprising to find that the sceptical respondents from Cluster 4 are 6.5 times more likely to think that there are almost no very relevant tools or goals than to think that there are many relevant tools, compared with the opinions about of respondents from Cluster 5.who think there are no or hardly any relevant tools. Following the same logic, respondents from Cluster 2, who foresee ICT revolutionary effects, are 0.4 times less likely to think that there are hardly any relevant ICT tools than many relevant tools, compared with the little relevance attached to tools in Cluster 5.

Knowledge and awareness of ICT measures

The last model uses the third policy variable that measures the respondents' knowledge and awareness of the respondents to various ICT measures. As with the variables that measure the number of "very much" answers, here also we have categorised the variable that measures the "don't know" answers to just four categories. The 4 categories were determined according to the frequencies of the number of DK answers. The categories are as follows:

8-11 DK answers = none or hardly any awareness;
3-7 DK answers = low awareness;
2-1 DK answers = medium awareness;
0 DK answers = high awareness.

The variable Policy 3 represents 4 categories of the number of "don't know" answers that a respondent indicated with regard to 11 different ICT tools designed to enhance ICT activities in his city.

According to the significance of both the Likelihood ratio (101.4 with 72 DF, significance level .0127) and the Pearson statistics (102.8 with 72 DF, significance level .0100), we can reject the null hypothesis that the model has a good fit with probability level 0.05. However, if we use a probability level of 0.01, according to the Likelihood tario chi-square statistic, we cannot reject the null hypothesis. Therefore, we have less confidence in the model fit.

Our analysis shows that respondents from Cluster 2 (struggling industrial city) have less knowledge and awareness of ICT tools, compared with respondents from City Cluster 7. According to the model, respondents are 3 times more likely to have none or hardly any awareness than high awareness in City Cluster 2, compared with none or hardly any awareness and high awareness in City Cluster 7. Also the odds of having low awareness of ICT compared with high awareness are higher in Cluster 2 than in Cluster 7.

Respondents from Cluster 3 (pessimistic regional city) are also likely to have less knowledge about ICT tools than the respondents from the reference category (City Cluster 7). Respondents from Cluster 3 are 2.8 and 2.7 times more likely to have no or low awareness, respectively, compared with the high awareness of respondents in Cluster 7. In addition, according to the model, respondents from City Cluster 6 are 2.5 times more likely to have low awareness than have high awareness, compared with respondents from Cluster 7.

The odds ratios of being in a certain ICT cluster and the extent to which a respondent is aware and has knowledge of ICT tools to enhance ICT activities and performance in his city. Shows that most of the estimates are not significant. However, we can see that respondents from both ICT Cluster 3 and Cluster 4 are less likely to have a low awareness than a high awareness, compared with respondents from Cluster 5. Thus, respondents who consider ICT as revolutionary or as an economic tool are likely to have high awareness of ICT tools.

10. Conclusions

ICT are increasingly becoming integral part of the city metabolism. On the one hand, their adoption appear to rise rapidly both among households and private and public

organizations. On the other hand, policy makers gradually recognise ICT as a relevant policy tool. However, urban ICT policies are in infant stage. Therefore, we are interested in understanding how urban decision makers perceive the opportunities of ICT policy, and in the factors that affect such perceptions.

This study offered 2 factors that may affect the perceptions of urban ICT policy: the perceptions of the city (the imaginable city) and beliefs about ICT. We have constructed second-order latent variables that represent the city and ICT. Using factor and cluster analysis, we have found a number of relatively homogeneous clusters in both the city constructs and ICT constructs. These clusters can be seen as prototypes of imaginable cities and prototypes of beliefs about ICT.

In order to test whether membership in a certain cluster is related to a certain type of policy perception, we used a Log-linear logit model. Doing this, we could indeed find such relationships, though not all of them were significant.

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Annex

Table A1: list of ICT-related tools and goals

Economic development is very a important area for the deployment of ICT
Improving citizen-municipality relations is a very important rationale for the municipality's deployment of ICT
ICT enables better networking with other cities
Improving telecommunication infrastructure
Promoting or supporting computer availability in public places
Promoting research about ICT
Promoting or supporting ICT training
Supplying municipality information via telecommunications
Promoting municipality services via telecommunication
Promoting ICT use in the planning process
Using ICT in transport planning
Promoting or supporting tele-working programmes
Promoting or supporting tele-medicine
Promoting or supporting tele-education

Table A2: Component matrix of 5 latent variables of "City"

The original variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Industrial centre	.005	.113	.115	.792	-.001
Service centre	.764	-.166	.005	.009	.148
Administrative centre	.742	-.009	.001	-.002	.007
Logistic centre	.460	-.116	.005	.564	.002
Tourist centre	.532	-.003	.228	-.384	.182
Commercial centre	.622	-.159	.105	.320	.160
ICT/multimedia centre	.708	-.005	.160	.112	.003
Higher education centre	.734	.125	.005	-.005	-.005
Traffic congestion	.166	.008	.006	-.004	.791
Housing shortage	.007	-.211	-.001	.004	.811
Unemployment	-.007	.824	-.001	.002	-.006
Industrial decline	-.001	.761	-.161	.005	-.002
Ageing population	-.003	.632	-.007	-.009	-.009
Negative image	-.347	.508	-.111	.388	.007
Budget deficit	-.004	.698	-.170	.004	-.006
The importance of our city	.197	-.163	.742	.003	.006
The potential to attract service companies	.215	.004	.734	.005	-.002
The potential to attract industrial enterprises	-.113	-.135	.664	.169	-.007
The potential to attract new residents	.006	-.250	.673	-.007	-.001
The importance of CBD in our city.	.007	-.003	.667	-.004	.009

Table A2: Component matrix of 3 latent variables of "ICT"

	Factor 1	Factor 2	Factor 3
The importance of our city	.265	.703	-.114
The potential of our city to attract service companies	.199	.767	-.009
The potential of our city to attract industrial enterprises	.003	.636	.164
The potential of our city to attract new residents	.008	.632	.367
The importance of the CBD our city	.005	.575	.390
ICT will change the policy-making process in our municipality	.495	.315	.164
The implementation of policies is more efficient with ICT	.589	.236	.272
ICT improve the ability of our city administration to serve the citizens	.821	.006	.0008
ICT improve citizen access to useful information	.808	.005	-.0005
ICT give the administration better access to public opinion	.687	.117	.301
ICT will increase citizen participation in the policy process	.558	.007	.457
ICT provide all segments of the population with equal access to education, employment and social services	.203	.007	.724
ICT improve the quality of social relationships	.134	.103	.724